PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Pumps and Compressors.

I, FRITZ EGERSDÖRFER, a citizen of Germany, Charlottenburg, Goethepark 5, Germany, Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in pumps or compressors of the revolving piston type, and more particularly in pumps or compressors in which the pistons or plungers are mounted in cylindrical pockets or bores located eccentrically of and parallel to the axis of a rotary drum, said pistons or plungers being adapted to be reciprocated upon rotation of the drum by means of a cam member disposed at an angle to the axis of the drum. In apparatus of this type the pockets are adapted for communication with admission and discharge ports made in the end wall or head of the casing enclosing the drum, and in order to provide a tight contact between the end face of the drum and the head it has heretofore been proposed to provide an axial chamber within the drum which is closed at its rear end by a sleeve secured to the driving shaft, and which communicates with the discharge port and includes a spring, the pressure of the fluid admitted to the said chamber and the spring cooperating to force the drum in tight contact with the end face or head of the casing. By thus providing a pressure chamber within the drum the diameter of the latter and the distance of the plungers from the axis are increased. The object of the improvements is to provide an apparatus in which this objection is removed, and which in addition is more simple in construction, and with this object in view I provide a chamber within the casing at the end of the drum opposite to the said ports, and a passage for transmitting the fluid pressure from the discharge port to said chamber. The springs are mounted within pockets disposed eccentrically within the drum.

Another object of the improvements is to provide an apparatus of the type referred to in which the blows produced within the pressure passage are compensated, and with this object in view I provide a balancing plunger within the passage connecting the pressure passage with the said chamber provided at the rear of the drum. In the preferred construction the said balancing plunger is made in two sections having a spring interposed between the same.

For the purpose of explaining the invention an example embodying the same has been shown in the accompanying drawing, in which Fig. 1, is a longitudinal section of a liquid pump taken on the line 1—1 of Fig. 2, Fig. 2, is a cross-section taken on the line 2—2 of Fig. 1, Fig. 3, is a detail sectional view taken on the line 3—3 of Fig. 1, and Fig. 4, is a detail view showing one of the controlling members and its ports.

In the construction shown in the figures, plungers 4 reciprocate in axial direction within bores or pockets made in a drum 2 rotatably mounted within a cylindrical casing 1. As shown three plungers 4 are provided which are connected to cylindrical slide blocks 22, as is best shown in Fig. 1, which slide blocks are engaged by arms 23 of a star shaped rocker having universal connection with the drum 2 by means of a spherical journal 24. The blocks 22 are formed at their ends with spherical cavities engaged by semi-spherical slide shoes 25 engaging on an inclined cam disk 26 adapted to be set in different angular positions relatively to the axes of the plungers 4 for varying the stroke of the plungers, as is known in the art. The driving shaft 7 carries a coupling member 27 formed with three arms each

[*Price* 1/-]

engaging a leaf spring 28 secured to cylindrical rockers 30 mounted in longitudinal bores 29 of the drum 2. Within the said bores coiled springs 31 are located which tend to force the rockers outwards and into contact with the coupling member 27. By reason of this clutch mechanism the drum 2 which is rotatably mounted on a shaft 32 is slightly yielding in circumferential and longitudinal direction relatively to the driving shaft 7.

The chamber 33 enclosing the driving mechanism is made air tight by the pump casing 1 and the drum 2, and it is in communication through a duct 34 with a cylindrical chamber 35. The side of the casing which is opposite to the chamber 33 is closed by a controlling disk or head 12 secured to the casing 1 and formed with segmental suction and pressure ports 10 and 11 and suction and pressure passages 10^1 and 11^1. In such cases, in which the pump is designed for supplying liquid the said ports extend over a comparatively large part of the circle, as is shown in Fig. 4. A duct 36 connects the passage 11^1 with the chamber 35. If the said chambers and passages are filled with the compressed liquid the pressure of the liquid is transmitted to the rear face of the drum 2, the pressure on the rear face of the drum corresponding to the pressure of the liquid acting on the front face formed with the controlling ports and holding the drum in contact with the controlling disk or head 12.

As shown in Fig. 1, within the chamber 35 a plunger is mounted which has the function to take up the blows of the liquid transmitted to the passage 35, so that such blows are not transmitted to the chamber 33. This is effected either by the inertia of the plunger or by providing a plunger yielding by elasticity without transmitting the shocks from the pressure side to the chamber 33. In the example shown in Fig. 1 the plunger is made in two sections 37 and 38 having a spring 39 disposed between the same. If a blow of the liquid is caused within the passage 11^1, such blow is transmitted through the duct 36 to the liquid confined within the left-hand part of the chamber 35 and to the section 37 of the plunger bounding the same, which is thereby shifted while compressing the spring 39. Upon the release of the blow the spring 39 returns the section 37 into initial position. If however the increased pressure remains constant there will be sufficient time for the spring 39 to advance the section 38 so as to transmit the increased pressure to the chamber 33. While the apparatus is under pressure the spring 39 is always compressed. Therefore the plunger 37, 38 has the function of a power storing member adapted to balance the pressure when withdrawing a certain amount of liquid from the passage 11^1 or the pressure passage connected therewith. This function is important for example in such cases, in which the pump is used as a fuel feed pump for internal combustion engines for throwing measured amounts of fuel into the cylinders of the engine. In such cases constantly short blows are caused in the liquid, which blows are taken up by the plunger 37, 38. Furthermore by reason of the power storing capacity the plungers assist the discharge of the individual fuel charges.

In the example shown in the figures, apart from the pressure producing plungers 4 plungers 40 are connected with the blocks 22, which plungers are smaller in diameter than the plungers 4 and cooperate with controlling ports 41 and 42. The object of these subsidiary plungers is to supply a second liquid under pressure, which is discharged independently of the main liquid discharge or admixed therewith, in which case the pressure port 42 is in communication with the pressure passage 11^1, as is shown in Fig. 1. Therefore the plungers 4 can be used for supplying fuel to an internal combustion engine, while the plungers 40 are used for supplying a certain amount of water to the said fuel.

The segmental controlling ports of the stationary disk 12 are arranged eccentrically of the axis of the rotary drum, so that the cooperating ports of the controlling member 2 and 12 are gradually brought into position for cooperation with each other.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A pump or compressor, comprising a rotary drum having plungers or pistons mounted in pockets disposed eccentrically of and parallel to the axis of the drum and adapted to be reciprocated upon rotation of the drum by a cam disposed at an angle to the axis of the drum, the admission and pressure ports being formed in the end wall or head of the casing enclosing the drum, and the drum being axially shiftable on the driving shaft and adapted to be forced by pressure fluid and spring action towards said end wall or head for tightening the ports, in which pump or compressor a pressure chamber (33) is provided within said casing at the side of the drum opposite to the said end wall or head, to which pres-

sure chamber the pressure of the discharge passage (11^1) is transmitted through a passage (35), the springs being mounted within pockets (29) formed in said drum and having a rear support on the driving shaft.

2. Pump or compressor as claimed in the preceding claim, in which between the pressure passage (11^1) and the chamber containing the liquid acting on the controlling member a balancing plunger (37, 38) is provided for taking up the blows produced within the pressure passage.

3. Pump or compressor as claimed in the preceding clause, in which the plunger taking up the blows of the fluid is made in sections (38, 37) having a spring interposed between the same.

4. Pump or compressor substantially as herein described and for the purpose set forth.

Dated this 15th day of June, 1923.

FR. EGERSDÖRFER.

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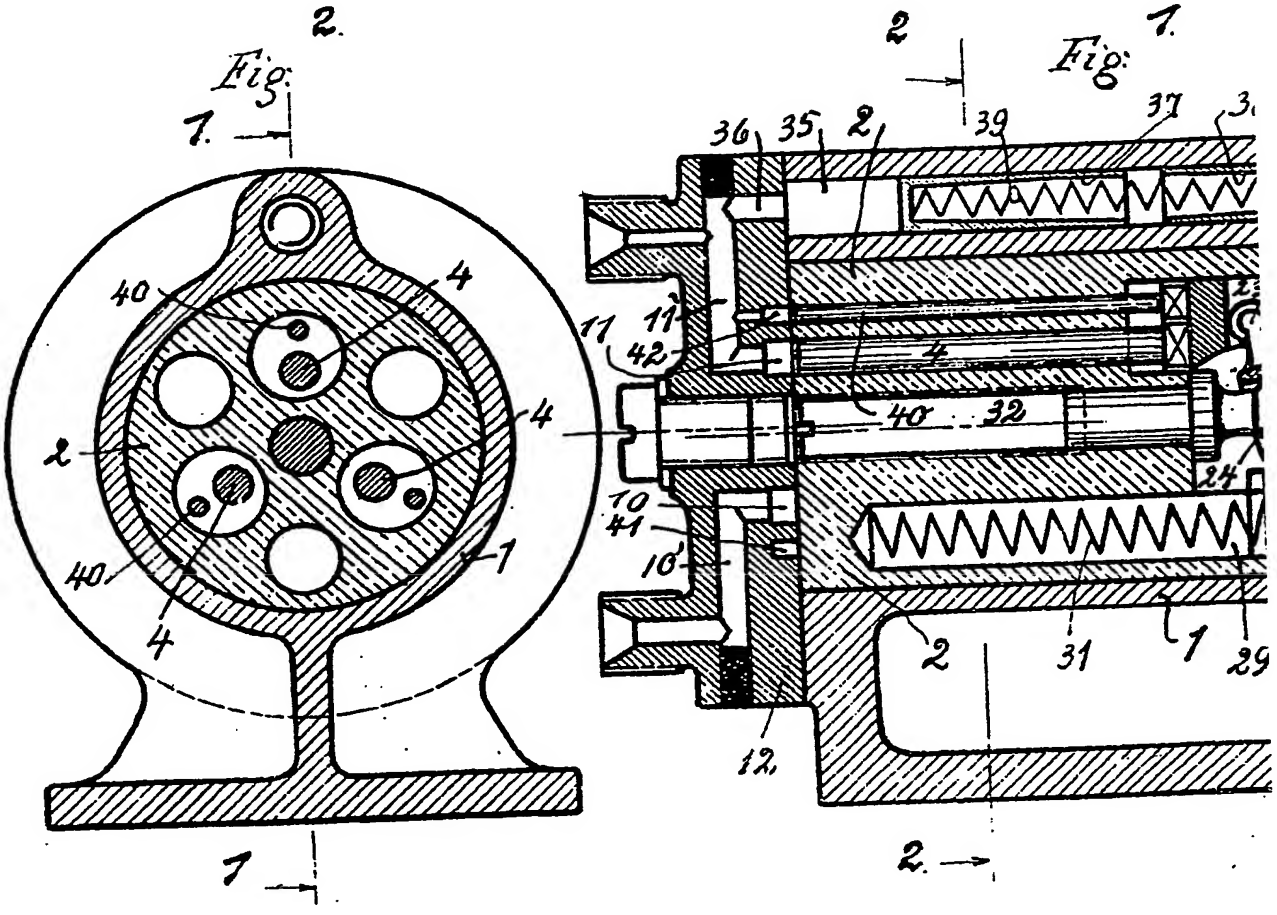

Fig. 1.

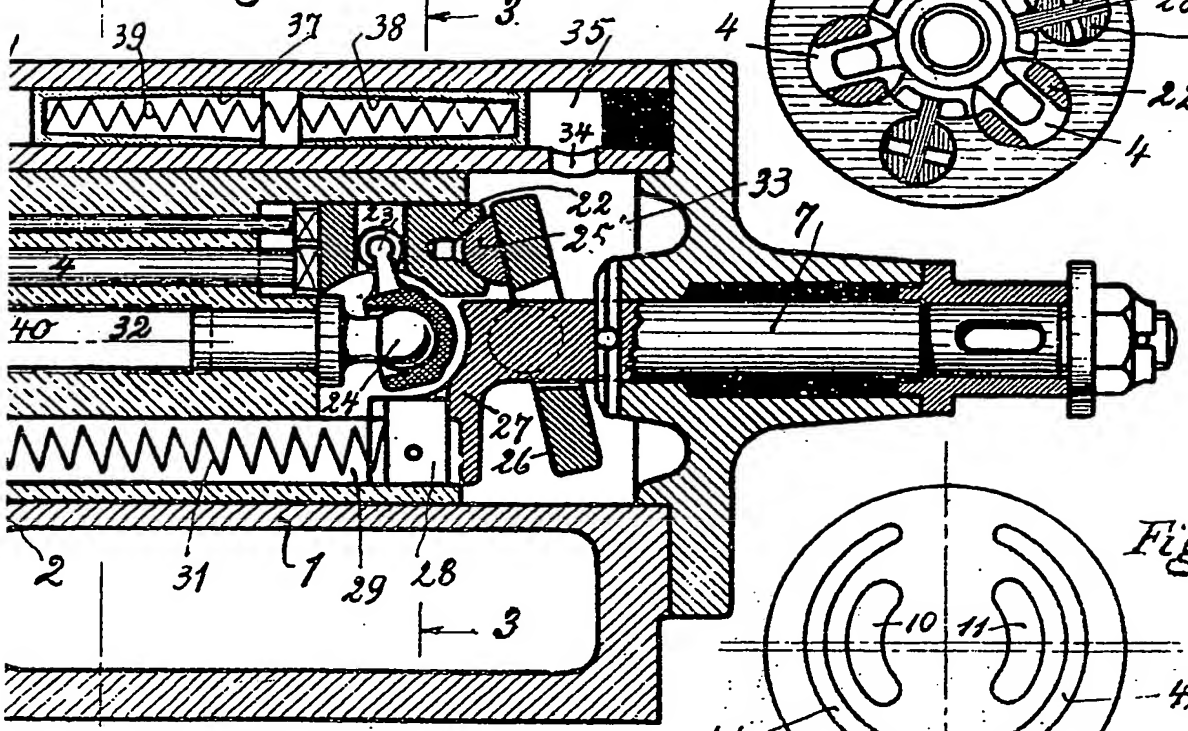

Fig. 3.

Fig. 4.

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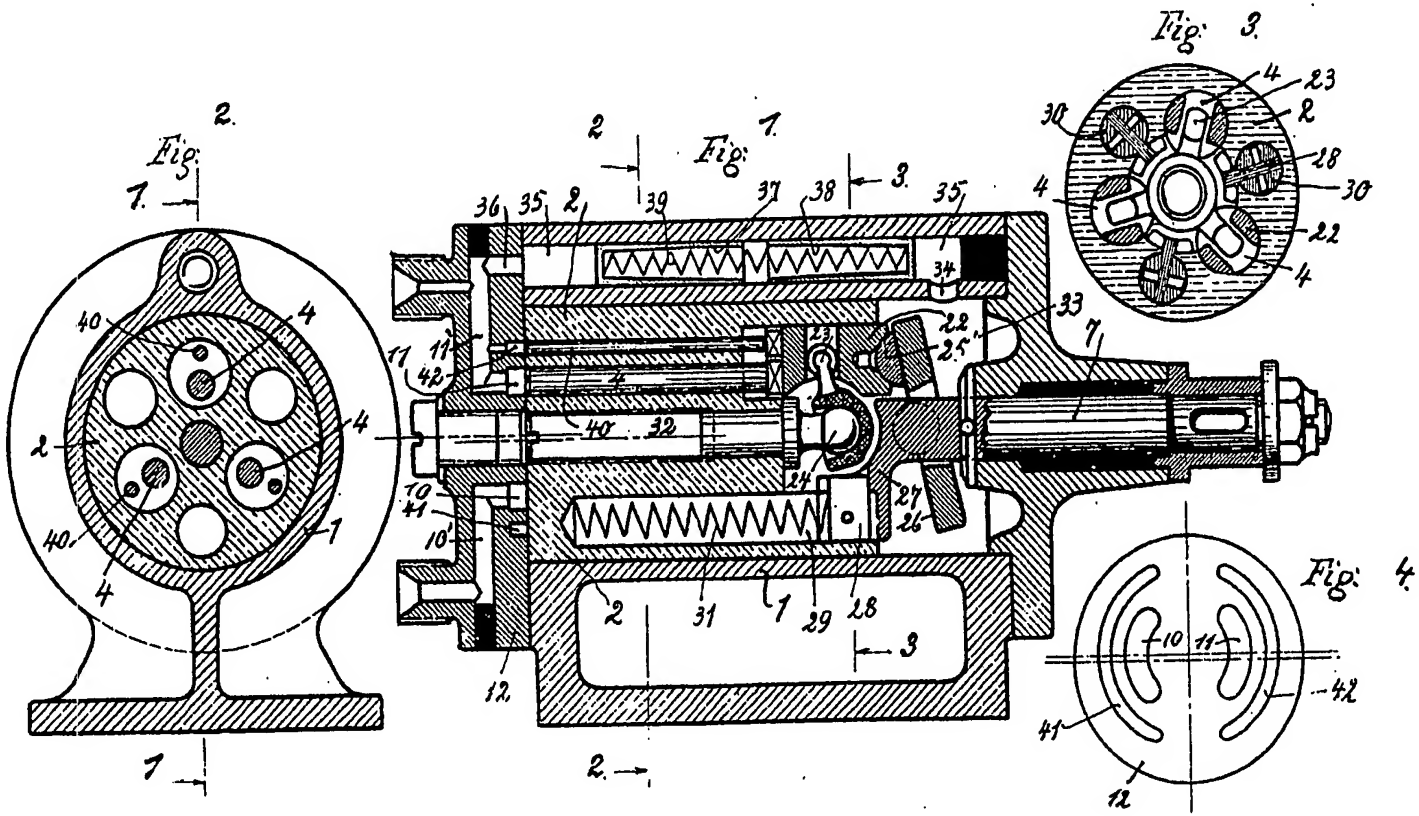

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